

CLAIMS

Claims 1 – 10 (previously canceled).

Claim 11 (currently amended): A method for manufacturing hydrogen cyanide, acrylonitrile, and acetonitrile, the method comprising:

providing at least one pulsed corona discharge reactor, each pulsed corona discharge reactor having a reaction zone;
positioning a catalyst in the reaction zone;
introducing at least one reactant feed stream containing hydrocarbon ~~hydrogen~~ into the pulsed corona discharge reactor and contacting the catalyst; and
removing hydrogen from the reactant feed stream to form hydrogen cyanide, acrylonitrile, and acetonitrile.

Claim 12 (currently amended): The method of claim 11 and further comprising:

constructing the walls of the pulsed corona discharge reactor ~~has walls~~ from membrane materials suitable for ~~the~~ selective continuous removal of hydrogen formed from ~~the~~ decomposition of the ammonia and hydrocarbon(s) in ~~a the~~ reaction zone wherein the continuous removal of hydrogen from the reaction zone drives the reaction to completion.

Claim 13 (original): The method of claim 11 and further comprising:

introducing an additive selected from the group consisting of air, oxygen and other combinations of nitrogen and oxygen into the reactant feed stream.

Claim 14 (currently amended): The method of claim 11 and further comprising:

adding ammonia and hydrocarbons into the reactant feed stream ~~streams~~.

Claim 15 (original): The method of claim 14 wherein the hydrocarbons include methane, ethane, propane, propylene, and ethylene.

Claim 16 (currently amended): The method of claim 11 and further comprising:
increasing the density of ions in the reaction zone with inert gases added to the reaction zone.

Claim 17 (currently amended): The method of claim 11 and further comprising:
operating the pulsed corona discharge reactor on continuous/intermittent removal of hydrogen products from the reaction zone.

Claim 18 (currently amended): The method of claim 11 and wherein the reactant is ~~reactants are~~ hydrocarbon and ammonia, a solid phase catalyst is positioned within the reaction zone, and air, oxygen, and/or nitrogen are added to the feed stream.